Claims

1. A structure for absorbing stress between a first electrical structure and a second electrical structure, said structure comprising:

a dielectric material disposed on at least one of said first electrical structure and said second electrical structure; and

wherein said dielectric material comprises a low modulus material which has a high ultimate elongation property, and wherein said dielectric comprises a low modulus high elongation (LMHE) dielectric which functions to absorb stress between said first and second electrical structures resulting from said first and second electrical structures having different coefficients of thermal expansion.

2. The structure of claim 1, wherein said LMHE dielectric has a Young's modulus of less than 50,000 psi.

3. The structure of claim 1, wherein said LMHE dielectric has an ultimate elongation property of at least twenty percent.

4. The structure of claim 1, wherein said LMHE dielectric comprises a photo patternable dielectric layer.

5. The structure of claim 4, wherein said photo patternable dielectric layer is at least 25 microns thick.

6. The structure of claim 1, further comprising at least one via opening in said LMHE dielectric, said at least one via opening exposing at least one electrical contact of said at least one first electrical structure or said second electrical structure having said LMHE dielectric layer disposed thereon.

7. The structure of claim 6, further comprising a metal layer over said LMHE dielectric and in said at least one via opening to electrically connect to said at least one electrical contact.

8. The structure of claim 7, wherein said metal layer comprises copper.

9. The structure of claim 7, further comprising an electrical interconnect electrically connecting said first electrical structure and said second electrical structure, said electrical interconnect being electrically coupled to said metal layer disposed over said LMHE dielectric layer to electrically connect to said electrical contact of said at least one first electrical structure or said second electrical structure.

10. The structure of claim 9, wherein LMHE dielectric layer has a Young's modulus less than a Young's modulus of said electrical interconnect connecting said first electrical structure and said second electrical structure.

11. The structure of claim 9, wherein said electrical interconnect comprises conductive bumps disposed between said first electrical structure and said second electrical structure.

12. The structure of claim 11, wherein said conductive bumps comprise at least one of solid bumps, raised pads or solder balls.

13. The structure of claim 7, wherein said metal layer comprises at least one conductor disposed above said LMHE dielectric layer, each conductor of said at least one conductor having a length L greater than a maximum displacement due to thermal expansion between said first and second electrical structures.

14. The structure of claim 13, wherein said length L of each conductor is at least five times said maximum displacement due to thermal expansion between said first and second electrical structures to facilitate stretching of said conductor.

15. The structure of claim 1, wherein said LMHE dielectric material has a Young's modulus of less than 20,000 psi, and wherein said LMHE dielectric material comprises a dielectric layer having a thickness in a range of 20-60 microns.

16. The structure of claim 15, wherein said LMHE dielectric material comprises an acrylated urethane material.

17. The structure of claim 1, wherein said first electrical structure and said second electrical structure each comprise one of a printed circuit board, a single chip module or a multichip module.

18. A method for absorbing stress between a first electrical structure and a second electrical structure, said method comprising:

providing a dielectric material disposed over at least one of said first electrical structure and said second electrical structure; and

wherein said providing of said dielectric material comprises providing a low modulus material which has a high ultimate elongation property, wherein said dielectric material comprises a low modulus high elongation (LMHE) dielectric which functions to absorb stress between said first and second electrical structures resulting from said first and second electrical structures having different coefficients of thermal expansion.

19. The method of claim 18, wherein said LMHE dielectric has a Young's modulus of less than 50,000 psi.

20. The method of claim 18, wherein said LMHE dielectric has an ultimate elongation property of at least twenty percent.

21. The method of claim 18, wherein said providing comprises providing said LMHE dielectric as a photo patternable dielectric layer.

22. The method of claim 21, wherein said providing of said photo patternable dielectric layer comprises providing said photo patternable dielectric layer with a thickness of at least 25 microns.

23. The method of claim 18, further comprising forming at least one via opening within said LMHE dielectric to expose at least one electrical contact of said at least one first electrical structure or second electrical structure having said LMHE dielectric disposed thereover.

24. The method of claim 18, wherein said LMHE dielectric has a Young's modulus of less than 20,000 psi, and wherein said providing comprises providing said LMHE dielectric as a dielectric layer with a thickness in a range of 20-60 microns.

25. The method of claim 24, wherein said LMHE dielectric has an ultimate elongation property of at least 20 percent.

26. The method of claim 25, wherein said LMHE dielectric comprises an acrylated urethane material.

27. A method of connecting a first electrical structure and a second electrical structure, said method comprising:

providing a dielectric layer on at least one of said first electrical structure and said second electrical structure, wherein said dielectric layer is a low modulus material having a high ultimate elongation property, and wherein said low modulus high elongation (LMHE) dielectric layer functions to absorb stress resulting from said first electrical structure and said second electrical structure having different coefficients of thermal expansion;

forming at least one via opening in said LMHE dielectric layer to expose at least one electrical contact of said at least one first electrical structure and second electrical structure having said LMHE dielectric layer disposed thereon;

forming a metal layer over said LMHE dielectric layer and in said at least one via opening to electrically connect to said at least one electrical contact; and

electrically connecting said first electrical structure and said second electrical structure using an electrical interconnect, said electrical interconnect being electrically coupled to said metal layer and therefore to said at least one electrical contact of said at least one first electrical structure or second electrical structure.

28. The method of claim 27, wherein said LMHE dielectric layer has a Young's modulus of less than 50,000 psi.

29. The method of claim 27, wherein said LMHE dielectric layer has an ultimate elongation property of at least twenty percent.

30. The method of claim 27, wherein said electrically connecting comprises providing conductive bumps disposed between said first electrical structure and said second electrical structure, said conductive bumps being said electrical interconnect.

31. The method of claim 30, wherein said conductive bumps comprise at least one of solid conductive bumps, raised pads or solder balls.

32. The method of claim 27, wherein said forming of said metal layer comprises defining at least one conductor above said LMHE dielectric, each conductor of said at least one conductor having a length L greater than a maximum displacement due to thermal expansion between said first and second electrical structures.

33. The method of claim 32, wherein said length L of each conductor is at least five times said maximum displacement, and wherein said length L of each said conductor is chosen to allow stretching thereof to accommodate any expansion mismatch between said first electrical structure and said second electrical structure.

34. The method of claim 27, wherein said providing of said LMHE dielectric layer comprises providing said LMHE dielectric layer with a curing agent of sufficient quantity to make said LMHE dielectric layer photo patternable.

35. The method of claim 34, wherein said forming at least one via opening in said LMHE dielectric comprises photo patterning said LMHE dielectric layer to form said at least one via opening therein.

36. The method of claim 35, wherein said providing comprises providing said LMHE dielectric layer with a thickness of at least 25 microns.

37. The method of claim 27, wherein said LMHE dielectric layer has a Young's modulus less than a Young's modulus of said electrical interconnect connecting said first electrical structure and said second electrical structure.

38. The method of claim 27, wherein said forming said metal layer comprises employing electroless copper deposition to form said metal layer.

39. The method of claim 27, wherein said LMHE dielectric has a Young's modulus of less than 20,000 psi and a thickness in a range of 20-60 microns.

40. The method of claim 27, further comprising prior to forming of said metal layer, texturing an upper surface of said dielectric layer by applying a powder and plasma etching said powder to roughen said upper surface of said dielectric layer to facilitate metallization thereof.

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